Claims:

What is claimed is:

1. An optical amplifier for amplifying a wavelength division multiplexed (WDM) light including signal lights wavelength division multiplexed together, the amplifier comprising:

an optical amplifying medium through which the WDM light travels and is thereby amplified via Raman amplification in accordance with multiplexed pump lights of different wavelengths traveling through the optical amplifying medium;

an optical device dividing the amplified WDM light into first and second divided lights in first and second wavelength bands, respectively;

a first optical amplifier amplifying the first divided light, the first optical amplifier having a gain band including the first wavelength band;

a second optical amplifier amplifying the second divided light, the second optical amplifier having a gain band including the second wavelength band; and

a controller controlling power of each pump light based on a power of the first divided light amplified by the first optical amplifier and a power of the second divided light amplified by the second optical amplifier.

2. An optical amplifier as claimed in claim 1, wherein

the first wavelength band is divided into a plurality of first individual wavelength bands,

the second wavelength band is divided into a plurality of second individual wavelength bands, and

the controller controls power of each pump light based on a wavelength characteristic of gain generated in the first individual wavelength bands and the second individual wavelength bands.

3. An optical amplifier as claimed in claim 1, wherein the first wavelength band is C-band and the second wavelength band is L-band.

4. An optical amplifier as claimed in claim 1, wherein the first wavelength band is C-band, the second wavelength band is L-band, the first optical amplifier is a C-band erbium doped fiber amplifier and the second optical amplifier is an L-band erbium doped fiber amplifier.

5. An optical amplifier as claimed in claim 2, wherein the first wavelength band is C-band and the second wavelength band is L-band.

6. An optical amplifier as claimed in claim 2, wherein the first wavelength band is C-band, the second wavelength band is L-band, the first optical amplifier is a C-band erbium doped fiber amplifier and the second optical amplifier is an L-band erbium doped fiber amplifier.

7. An optical amplifier as claimed in claim 2, wherein the controller controls the power of each pump light to reduce a wavelength characteristic deviation of power between the first and second individual wavelength bands.

8. An optical amplifier as claimed in claim 2, wherein the controller controls the power of each pump light to set a power of each first and second individual wavelength band to be equal.

9. An optical amplifier for amplifying a wavelength division multiplexed (WDM) light including signal lights wavelength division multiplexed together, the amplifier comprising:

an optical amplifying medium through which the WDM light travels and is thereby amplified via Raman amplification in accordance with multiplexed pump lights of different wavelengths traveling through the optical amplifying medium;

an optical device dividing the amplified WDM light into first and second divided lights in first and second wavelength bands, respectively;

a first optical amplifier amplifying the first divided light, the first optical amplifier having a gain band including the first wavelength band;

a second optical amplifier amplifying the second divided light, the second optical amplifier having a gain band including the second wavelength band; and

a controller controlling output powers of the pump lights in accordance with a difference in power of the first divided light before and after being amplified by the first optical amplifier, and with a difference in power of the second divided light before and after being amplified by the second optical amplifier.

10. An optical amplifier as claimed in claim 9, wherein

the first wavelength band is divided into a plurality of first individual wavelength bands,

the second wavelength band is divided into a plurality of second individual wavelength bands, and

the controller controls output powers of the pump lights in accordance with differences in power of the first divided light in each first individual wavelength band before and after being amplified by the first optical amplifier, and in accordance with differences in power of the second divided light in each second individual wavelength band before and after being amplified by the second optical amplifier.

11. An optical amplifier as claimed in claim 9, wherein the first wavelength band is C-band and the second wavelength band is L-band.

12. An optical amplifier as claimed in claim 9, wherein the first wavelength band is C-band, the second wavelength band is L-band, the first optical amplifier is a C-band erbium doped fiber amplifier and the second optical amplifier is an L-band erbium doped fiber amplifier.

13. An optical amplifier as claimed in claim 10, wherein the first wavelength band is C-band and the second wavelength band is L-band.

14. An optical amplifier as claimed in claim 10, wherein the first wavelength band is C-band, the second wavelength band is L-band, the first optical amplifier is a C-band erbium doped fiber amplifier and the second optical amplifier is an L-band erbium doped fiber amplifier.

15. An optical amplifier as claimed in claim 10, wherein the controller controls the power of each pump light to reduce a wavelength characteristic deviation of power between the first and second individual wavelength bands.

16. An optical amplifier as claimed in claim 10, wherein the controller controls the power of each pump light to set a power of each first and second individual wavelength band to be equal.

17. An optical amplifier for amplifying a wavelength division multiplexed (WDM) light including signal lights wavelength division multiplexed together, the amplifier comprising:

an optical amplifying medium through which the WDM light travels and is thereby amplified via Raman amplification in accordance with multiplexed pump lights of different wavelengths traveling through the optical amplifying medium;

an optical device dividing the amplified WDM light into first and second divided lights in first and second wavelength bands, respectively;

a first optical amplifier amplifying the first divided light, the first optical amplifier having a gain band including the first wavelength band;

a second optical amplifier amplifying the second divided light, the second optical amplifier having a gain band including the second wavelength band; and

means for controlling power of each pump light based on a power of the first divided light amplified by the first optical amplifier and a power of the second divided light amplified by the second optical amplifier.

18. A method comprising:

causing a wavelength division multiplexed (WDM) light to travel through an optical amplifying medium to thereby amplify the WDM light via Raman amplification in accordance with multiplexed pump lights of different wavelengths traveling through the optical amplifying medium, the WDM light including signal lights wavelength division multiplexed together;

dividing the amplified WDM light into first and second divided lights in first and second wavelength bands, respectively;

amplifying the first divided light with a first optical amplifier having a gain band including the first wavelength band;

amplifying the second divided light with a second optical amplifier having a gain band including the second wavelength band; and

controlling power of each pump light based on a power of the amplified first divided light and a power of the amplified second divided light.

19. A method comprising:

causing a wavelength division multiplexed (WDM) light to travel through an optical amplifying medium to thereby amplify the WDM light via Raman amplification in accordance with multiplexed pump lights of different wavelengths traveling through the optical amplifying medium, the WDM light including signal lights wavelength division multiplexed together;

dividing the amplified WDM light into first and second divided lights in first and second wavelength bands, respectively;

amplifying the first divided light with a first optical amplifier having a gain band including the first wavelength band;

amplifying the second divided light with a second optical amplifier having a gain band including the second wavelength band; and

controlling output powers of the pump lights in accordance with a difference in power of the first divided light before and after being amplified by the first optical amplifier, and a difference in power of the second divided light before and after being amplified by the second optical amplifier.